

ABSTRACT OF THE DISCLOSURE

A simplified direct oxidation fuel cell system is disclosed. The fuel cell is constructed in such a manner that fuel is added to the cell anode as it is consumed and water is evaporated off at cell cathode so that there is no need for recirculation of unreacted fuel at the cell anode or water at the cell cathode. In addition, carbon dioxide generated from the anodic reaction is passively vented out of the system by using a CO₂ gas permeable membrane material integrated as part of the anode chamber construction. It is thus possible that, the CO₂ separation from the anode fluid occurs without the recirculation of the anode fluid outside the anode chamber. In one embodiment, the simplified direct oxidation fuel cell includes a gas permeable, liquid impermeable membrane placed in close proximity to the anode to perform the carbon dioxide separation. In accordance with a further aspect of the invention, a fuel container and delivery assembly is provided, which includes separate conduits from separate containers for methanol and water and a leak-proof interface. This allows for mixing of water into the methanol solution, to allow for improved ability to adjust the concentration of methanol and water in the system. The fuel container and delivery assembly operates using simple mechanical flow and simplified geometry. This design minimizes loss of methanol and water via carryover and crossover by limiting introduction of those fluids. The passive system in which fuel is added as it is consumed and CO₂ separated, both without pumping, ultimately will increase net power provided to the load due to low parasitic losses.